DEPARTMENT OF HEALTH AND HUMAN SERVICES

NATIONAL INSTITUTES OF HEALTH

Health Issues and Opportunities at NIH

Witness appearing before the
House Subcommittee on Labor-HHS-Education Appropriations

Elias A. Zerhouni, M.D.
Director, NIH

Accompanied by:

Richard Turman
Deputy Assistant Secretary, Budget

March 5, 2008

Good afternoon, Mr. Chairman, and distinguished Members of the Subcommittee. It is an honor and a privilege to appear before you today to present the National Institutes of Health (NIH) budget request and to discuss the priorities of NIH for this year and beyond.

Research is the basis of virtually every improvement in health and medicine. The impact of scientific research, however, extends far beyond disease. Throughout history, advances in science and technology strengthened our economy, raised our standard of living, enhanced our global leadership, and lengthened and improved our lives.

But to sustain these achievements, the flow of new scientific knowledge must be both continuous and substantive. Despite monumental progress, science remains a difficult frontier to explore. In this century, our society faces even greater challenges to the human condition that will require innovative and unprecedented scientific and technological advances across all fields of science, but most particularly in the life sciences. NIH's investment of $29.5 billion in FY 2009 will be used to support such advances.

NIH plays a significant role in the extension of life and the prevention and treatment of many diseases, transforming modern research and medicine in countless ways. For example, not long ago, acute, short-term and lethal conditions such as heart attacks, stroke, acute infections and cancers were the dominant causes of early mortality. Today, life expectancy has markedly increased due to progress made in reducing death from such acute conditions. However, these advances indirectly led to a major rise in the burden of chronic long-term conditions. It is estimated 75% of today's healthcare expenditures relate to chronic diseases. The emergence and consequences of chronic conditions -- like obesity, diabetes, or Alzheimer's disease -- are examples of the challenges we face. Healthcare costs are rising exponentially. We must continue our focus on not only *how* we best deliver healthcare, but more importantly, *what* healthcare we deliver.

A New Strategic Vision for Medicine

Given this dramatic shift from acute to chronic disease, the strategies for preventing and treating diseases are beginning to shift. Today, we intervene late, when the patient exhibits symptoms of disease. Our research is changing this approach, so that we may intervene

much earlier in the natural cycle of diseases, years before they strike their victims. We must now develop a much more preemptive approach that manages disease over its entire life cycle, from identifying an individual's susceptibility to a disease, to prevention, early diagnosis, reduction of complications, and smarter therapies.

This shift from a late curative paradigm to an early preemptive one is becoming increasingly possible, thanks to the avalanche of recent discoveries funded by NIH. For example, in 2002, when I became NIH Director, we knew of one important gene abnormality in type 2 diabetes. In the last year alone, researchers uncovered 7 new genes or genetic regions that provide new clues to how this disease may develop. Remarkably, I now receive about one report a week of a significant discovery in the field of genomics. Recent discoveries apply to a broad spectrum of chronic diseases, ranging from mental disorders to autism. We now can see a clear path to what we call "the 4 P's of Medicine": medicine that will be more Predictive, Personalized, Preemptive, and Participatory.

To reach these key long-term goals, NIH is strategically investing in research to further our understanding of the fundamental causes of diseases at their earliest molecular stages. But individuals respond differently to environmental conditions, according to their genetic endowment and their own behavior. In the future, research will allow us to *predict* how, when, and in whom a disease will develop. We can envision a time when we will be able to precisely target treatment on a *personalized* basis to those who need it, avoiding treatment to those who do not. Ultimately, this individualized approach will allow us to *preempt* disease before it occurs, utilizing the *participation* of individuals, communities, and healthcare providers in a proactive fashion, as early as possible, and throughout the natural cycle of a disease process.

This prospective management approach to disease is vital to the transformation of medicine of tomorrow. Today's discoveries are paving the way to make this future a reality. NIH continues its research efforts to search for cures to alleviate the suffering of the millions already affected by disease—and is greatly expanding the scope of research to discover entirely novel ways to stop disease in its tracks before it cripples us. This entails investing in completely new areas of investigation, while sustaining the level of our current

efforts and supporting talented scientists using novel methodologies to explore new ideas and concepts that were impossible to envision only a few years ago.

Today's Scientific Advances Are Tomorrow's Medicine

Consider how more predictive and personalized treatments could improve the safety and effectiveness of medications. The same medication can help one patient and be ineffective for, or toxic to, another. With the emergence of a field of research called pharmacogenomics, we will increasingly know which patients will likely benefit from treatment and which will not benefit, or worse, be harmed. Cancer chemotherapy and the use of the anticoagulant Coumadin are good examples of how this might be applied.

Research on viruses is improving the lives of Americans and people around the world. NIH supported the early research that led to the discovery and development of antiretroviral therapies for HIV/AIDS. Today, antiretroviral therapies are benefitting millions of Americans as the most effective means of treating HIV infections. These therapies are also helping millions of people in Africa and the Caribbean through the President's Emergency Plan for AIDS Relief.

Current HIV/AIDS therapies focus on the virus itself. Researchers are trying to understand how the virus enters the human cell and hijacks the cellular machinery, so it can replicate and spread. In a recent experiment, researchers made significant progress toward reaching this goal. Their new approach is based on a process called RNA interference discovered in 1998 and recognized with a Nobel Prize in 2006. Using RNA interference, the researchers suppressed the activity of every single gene in a type of human cell. They discovered more than 276 human proteins that seem essential to the replication of the HIV virus in human cells. This experiment, unthinkable a few years ago, can now be exploited to develop new ways of disabling this deadly virus.

Fundamental research can unexpectedly lead to revolutionary breakthroughs. Scientists at the National Cancer Institute, for example, developed a virus-like particle technology that formed the basis for new commercial vaccines that target specific cancers. In June 2006, the U.S. Food and Drug Administration approved the vaccine Gardasil, which is highly effective in preventing infections from the four types of human papilloma virus (HPV) that

cause the majority of cervical cancers in women. Worldwide use of this vaccine could save the lives of 200,000 women each year. This is the first example of a truly *preemptive* strategy in cancer.

More often than not, it is the sustained combination of multiple approaches—from the most basic science to epidemiological and behavioral research—that makes advances in science effective. One important public health success story is the reduction in tobacco use and related diseases. In the last decade, overall cancer death rates dropped for the first time in a century, driven largely by the dramatic reduction in male smoking from 47% in the 1960s to less than 23% today. This reduction, along with more effective early screening tools like mammography and colonoscopy, is changing the landscape of cancer mortality. These successes reflect the outcome of significant research investments made by many NIH Institutes and Centers (ICs) and our sister agencies over the last 50 years.

Our ability to predict and preempt disease also hinges on the development of new diagnostics based on recent discoveries in genomics, proteomics, systems biology, and imaging. Among the diagnostic capabilities currently being explored are:

- Point of Care Diagnostic Testing – NIH supports research that has and will develop technologies that offer instant diagnosis in the emergency room or physician's office, or at home, including rapid analysis of blood for assays such as chemistry, electrolytes and blood gases; biosensors that instantly detect signs of heart disease or infections; and biochips that detect disease processes at the molecular level.
- Salivary Diagnostics – Scientists identified genes and proteins expressed in salivary glands that we believe will replace some forms of urine or blood analysis in the detection of cancer, heart disease, diabetes, and other conditions.
- Optical Imaging – NIH-supported researchers are developing imaging techniques that seek to reduce the need for invasive diagnostic procedures. These new tools include fiber optic probes to detect malignant tissues, with the potential of avoiding invasive biopsies with a more accurate method of analysis; optical coherence tomography to identify heart disease; and multiphoton microscopy to study living cells and tissues.
- Brain-Wiring Diagrams – NIH-supported researchers developed a way to reveal connections made by a single nerve cell in living tissue. We hope one day to

construct a wiring diagram of the billions of nerve cells that constitute the brain's visual centers that might allow us to diagnose and treat vision loss with far more success – an advance that has implications for many other brain diseases as well.

- Autism Genes – Research into autism discovered clues that rare genetic changes represent a risk for autism. With this preliminary result, we are on at least one path to understanding methods of predicting autism risk in infants.

The Challenges that Lie Ahead

We are optimistic about by recent discoveries. However, there are challenges that lay ahead of us. The budget request provides $29.5 billion to help fill gaps in our fundamental understanding of health and disease. We still need to focus much of our efforts on fundamental research. New threats and diseases constantly emerge. For example, soldiers suffering from blast injury highlight the importance of additional knowledge on traumatic brain injuries. Infectious diseases remain among the leading causes of death worldwide. More than 30 newly recognized infectious diseases and syndromes emerged in the last three decades alone, including HIV/AIDS and SARS. Infectious diseases that once seemed to be fading, such as tuberculosis and malaria, have resurged. New drug-resistant forms of once-easily treated microbial infections are emerging at a rapid pace. New strains of influenza occur each year. There is concern that a new influenza virus may emerge with the capacity for sustained human-to-human transmission, possibly triggering a pandemic similar to what occurred in 1918, 1957, and 1968.

The tragic events of September 11, 2001, and the deliberate release of anthrax in the Nation's capital, drove home the realization that certain deadly pathogens, such as smallpox or anthrax, could be used deliberately as agents of bioterrorism against the civilian population – similar to radiological, nuclear, and chemical threats. Research in these arenas is critical to meeting these threats, and $1.7 billion is included in FY 2009 budget for such NIH-supported research.

Efforts to prevent, detect, and treat disease require better understanding of the dynamic complexity of the many biological systems of the human body and their interactions with our environment at several scales—from atoms, molecules, cells and organs, to body and mind. As the questions become more complex, and even as knowledge grows, research

itself becomes more multi-faceted. We recognize that to effectively push science/new knowledge forward, researchers and scientists must begin to work more collaboratively to develop unifying principles that link apparently disparate diseases through common biological pathways and therapeutic approaches. Today, and in the future, NIH research must reflect this new reality. Advanced technologies, including sophisticated computational tools and burgeoning databases, need to be more widely shared with easy and public access. The scale and intricacy of today's biomedical research problems increasingly demand that scientists move beyond the borders of their own disciplines and apply new organizational and interdisciplinary models for science. One of NIH's most pressing challenges is to generate and maintain the trained and creative biomedical workforce necessary to tackle the converging and daunting research questions of this century.

Many of our public health problems have a behavioral component. To put evidence-based interventions into place, all of society must participate. To confront obesity, NIH researchers must continue to address a multitude of intersecting factors, from inherent biological traits that differ among individuals, to environmental and socioeconomic factors and behavioral factors that may have molecular and environmental influences. NIH developed innovative intervention programs such as the WE CAN (Ways to Enhance Children's Activity & Nutrition), now in several hundred communities. WE CAN is designed to help children maintain a healthy weight by promoting improved food choices, increased physical activity, and reduced screen time.

NIH's primary mission is to develop new knowledge in biology and behavior and to apply this knowledge for the benefit of all. NIH is taking a more proactive role in helping to translate these discoveries into practice. For example, we have engaged in the most profound reform of translational and clinical research in the United States in over 50 years. The NIH Common Fund (CF), a new clinical and translational science program, now supports 33 academic centers of excellence charged with the dual task of translating research from the laboratory to patients and discovering the most effective ways of implementing what we know best at the community level. Success in these endeavors depends heavily on our ability to train a new generation of clinician-scientists steeped in

modern methodologies and concepts of basic and translational research. This new generation of researchers must be able to work seamlessly with basic and applied scientists in an interdisciplinary environment.

Through our ICs, NIH conducts many comparative effectiveness trials that provide evidence for more effective strategies of care. In collaboration with the Centers for Medicare and Medicaid Services (CMS), NIH is now launching a comparative effectiveness study of two drugs (Avastin and Lucentis) with different costs that are used to block growth of abnormal blood vessels in patients with age-related macular degeneration (AMD). If the less-expensive drug proves effective, it could drastically reduce the costs to CMS for treating AMD. Many similar NIH-supported comparative effectiveness trials are uncovering evidence that shows, for example, that older generic drugs can often be as effective as newer medications in the treatment of high blood pressure (ALLHAT trial), or certain mental health disorders (CATIE trial). In order to disseminate these results, ALLHAT investigator-educators made 1,696 presentations to 18,905 clinicians in 42 states and Washington, DC.

Given the structure of our healthcare system, it is often difficult for providers to implement the evidence from these large NIH trials. This challenge is real and requires that all relevant parties work collaboratively toward a more systemic approach that goes beyond simply conducting more research of this type. All healthcare components must come together to develop clear follow-through mechanisms to implement the evidence generated by these large trials.

Our Nation Must Spur Innovation

With the NIH Reform Act of 2006 (P.L. 109-482), Congress provided a foundation for the centerpiece of the NIH Common Fund (CF) for Medical Research that provides "incubator space" to spur innovation. The CF supplies a centralized source of funding for trans-NIH initiatives to meet the research and training needs of the 21st century and stimulate innovation. Research initiatives supported by the CF must not only be trans-NIH and fill a gap in our knowledge base but also be potentially transformative. The CF invests in systems biology, interdisciplinary research, biocomputing and clinical research, all of

which are fundamental to moving biomedical research forward expeditiously. The budget request includes $534 million for such activities.

The Human Microbiome project is one such initiative. It promises to reveal how bacteria and other microorganisms that are found naturally in the human body (the "microbiome") influence a range of biological processes, including development, immunity, and nutrition. This effort will not only improve our understanding of how an individual's microbiome relates to disease, but will also support the development of new technologies and computational approaches—all cross-cutting outputs that can be applied to investigations of other biosystems.

Another new initiative at the biomedical research frontier is the NIH Epigenomics Program. It will scan the human genome to study heritable features that do not involve changes to the underlying DNA sequence, but significantly affect gene expression and inform us about how DNA is regulated. This analysis of epigenetic changes should reveal new cellular pathways and mechanisms that influence disease progression. Also, the CF continues to support other important initiatives, such as the Pioneer Award program for $36 million in FY 2009 which nurtures high risk ideas that, if successful, can have unusually high scientific impact.

Nurturing a new generation of innovators is critical to our future research endeavors. NIH makes strategic investments at every point in the pipeline to improve the flow of talent drawn from every part and population of America. We produce teaching supplements to help educators in grades 2 through 12 convey difficult concepts through engaging activities, improving health literacy, and hopefully sparking children's interests in careers in research. NIH offers undergraduate students research experiences, especially geared toward tapping the vast potential of young people from historically underrepresented groups in the sciences. NIH grants fund graduate students and post-doctoral fellows, who go on to fill most every niche in the American biomedical research enterprise—from academic research to private industry, and from venture capitalists to policy makers. But most importantly, young people need to see, at all stages of the pipeline, that biomedical research is an attractive career. They need to see that there is a stable research enterprise, providing them opportunities to explore their best ideas for improving human health. The

budget request includes $123 million for individual fellowship awards under the Ruth L. Kirschstein program.

NIH-supported scientists continue to discover the fundamental underpinnings of human biology in all of its complexity through investigator-initiated research, the mainstay of creativity in science. Thus, one of the top budget priorities is to sustain the number of competing Research Project Grants (RPGs). The budget funds essentially the same level of competing RPGs in 2009 as estimated in 2008— about 9,760 RPGs at $3.5 billion. Overall, NIH will support nearly 38,260 RPGs at $15.5 billion. This was accomplished, in part, by holding down inflationary increases for existing and new grants.

One example of our efforts to sustain the research enterprise is the Director's Bridge Awards, which funded 244 meritorious scientists in 2007 who would have otherwise lost funding. It preserves the U.S. investment in investigators, laboratories, and the research projects deemed essential to our mission. We expect to continue this successful approach in 2009.

Our priorities continue to focus on maintaining a competitive and viable scientific support system, especially for new and early-career scientists. Our long-term demographic projections show the aging of the Nation's scientific workforce. Unless we take an immediate and substantial proactive stance in protecting early-career scientists, this situation will have a negative and long-lasting impact on our competitiveness and innovation as a Nation. In 2007, we set a goal for the number of new career investigators based on the historic five year average of more than 1,500 – it was surpassed. This represented a substantial increase in new career investigators over the number in 2006 of 1,353. We plan to continue this commitment in 2008 and 2009.

In 2007 and 2008 we also targeted earlier career stages, such as the Pathway to Independence Awards, supported by all NIH ICs. These awards provide 5 years of support for over 170 postdoctoral trainees a year to encourage risk-taking and independence. NIH plans to fund over 350 postdoctoral scientists by the end of 2008 and continue the program in 2009. The budget request includes $56 million for the New Innovator Awards, which support newly-independent scientists with novel ideas and potentially large scientific

impact. Scientists must be within the first 10 years of receiving their doctoral degree to qualify. NIH funded 30 awards in 2007 and plans to maintain this promising program.

Summary

At NIH, building toward the future involves innovations in multiple areas. We are in the midst of an explosion of new discoveries and novel opportunities for progress across all areas of science—from the most basic discoveries, such as the sequencing of the human genome, to the development of fields—like nanotechnology—that did not exist a few years ago. These advances have dramatically expanded the scope and capacity of the Nation's research enterprise, a goal and outcome of the doubling of the NIH budget.

This remarkable growth in research capacity was accomplished, in part, by leveraging NIH and private sector resources to nurture more investigators, develop new technologies, and build infrastructure. The Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs, helps entrepreneurs, as they translate science to market products to improve health and help maintain American economic leadership. A total of 4,350 new technologies were brought to market by 189 universities, hospitals, and private research institutions from 1998 through 2006. From 1980 to 2006, a total of 5,724 new companies were formed around technologies developed by research institutions, many directly funded by NIH. The U.S. is now the preeminent force in biomedical research. Our Nation continues to lead the highly competitive biotechnology and pharmaceutical sectors. Yet, we are also the focus of increasing competition from growing research in Europe and Asia. NIH programs produce steady streams of novel discoveries and innovative researchers that flow into our industries, making them more competitive. We must continually sustain the momentum of U.S. biomedical research, or risk losing it. Complacency is unacceptable!

We stand today at a crossroads in our efforts to improve health. Healthcare costs are rising. As a society, we must commit to moving forward and capitalize on the momentum created by advances in science and technology. We need to sustain this momentum. Progress in the life sciences in this century will be a major determinant of our Nation's health, its competitiveness, and its standing in the world. This is truly a race against time—a race that we cannot afford to lose.

Dr. Elias A. Zerhouni

NIH Director, Elias A. Zerhouni, M.D., leads the nation's medical research agency and oversees the NIH's 27 Institutes and Centers with more than 18,000 employees and a fiscal year 2008 budget of $29.5 billion.

The NIH investigates the causes, treatments, and preventive strategies for both common and rare diseases, helping to lead the way toward important medical discoveries that improve people's health and save lives. More than 83% of the NIH's funding is awarded through almost 50,000 competitive grants and awards to more than 300,000 scientists and research support staff at more than 3,000 universities, medical schools, and other research institutions in every state and around the world. About 10% of the NIH's budget supports projects conducted by nearly 6,000 scientists in its own laboratories, most of which are on the NIH campus in Bethesda, Maryland.

Dr. Zerhouni, a world renowned leader in the field of radiology and medicine, has spent his career providing clinical, scientific, and administrative leadership. He is credited with developing imaging methods used for diagnosing cancer and cardiovascular disease. As one of the world's premier experts in magnetic resonance imaging (MRI), he has extended the role of MRI from taking snapshots of gross anatomy to visualizing how the body works at the molecular level. He pioneered magnetic tagging, a non-invasive method of using MRI to track the motions of a heart in three dimensions. He is also renowned for refining an imaging technique called computed tomographic (CT) densitometry that helps discriminate between non-cancerous and cancerous nodules in the lung.

Since being named by President George W. Bush to serve as the 15th Director of the National Institutes of Health in May 2002, Dr. Zerhouni has overseen a number of milestones:

Reauthorization demonstrated renewed confidence in NIH

Congress passed and President Bush signed into law the National Institutes of Health Reform Act of 2006. The agency's third reauthorization in history and first since 1993, it signaled renewed confidence in the NIH mission, its employees and its leadership. The new law provides the NIH director expanded authority to manage the agency, encourages NIH Institutes and Centers (ICs) to collaborate on trans-NIH research and reforms the agency's reporting system. Reauthorization will strengthen the links within NIH and between the intramural and extramural research communities. Ultimately, it will help NIH more effectively balance what has traditionally worked in science — freedom of exploration, autonomy, decentralization — with providing opportunities for people to collaborate and cooperate more freely.

Development of a new office to improve trans-NIH initiatives

In 2005, NIH launched the Office of Portfolio Analysis and Strategic Initiatives (OPASI) in the Office of the NIH Director to transform the way NIH finds and funds cutting-edge research, improve our ability to identify public health challenges, and increase trans-NIH dialogue, decision-making and priority-setting. OPASI will build upon the model of the NIH Roadmap for Medical Research and will coordinate with

NIH ICs and external stakeholders to identify research priorities that will ultimately improve NIH's ability to be nimble, dynamic, and responsive to emerging scientific opportunities and public health needs.

Although OPASI will not have grant-making authority, it will provide an "incubator space" to jump-start trans-NIH initiatives and support ICs that will take the lead on priority projects on a time-limited basis (5 to 10 years). These OPASI initiatives will be supported by the "Common Fund for Shared Needs," a central funding source built upon the Roadmap budget model. Building from current Roadmap funds, which amount to about 1.6 percent of NIH's total budget in fiscal year 2007, the Fund will increase to up to 5 percent of the total NIH budget depending on NIH budget growth, scientific opportunities and public health needs.

Initiated the NIH Roadmap for Medical Research

Launched in September 2003, the NIH Roadmap for Medical Research, a new research vision to accelerate medical discovery to improve health, focuses the attention of the biomedical research community on new pathways of discovery, research teams for the future and the re-engineering of the clinical research enterprise. It aims to accelerate the pace of discovery and speed the application of new knowledge to the development of new prevention strategies, new diagnostics and new treatments, and, ultimately, to the transfer these innovations to health care providers, and the public.

Established an NIH-wide research initiative to address the obesity epidemic

The Strategic Plan for NIH Obesity Research is a multi-dimensional research agenda that addresses one of the nation's most dramatic health challenges. In the U.S. population, recent figures show that 65 percent of adults—or 130 million people are overweight or obese. The strategic plan enhances both the development of new research in areas of greatest scientific opportunity and the coordination of obesity research across the NIH. The plan calls for interdisciplinary research teams to bridge the study of behavioral and environmental causes of obesity with the study of genetic and biologic causes.

Supported the NIH Neuroscience Blueprint

Mental illness, neurological disorders and a range of behavioral disorders are major causes of human suffering and contribute greatly to the burden of disease. These illnesses exact a cost of $500 billion each year. NIH Directors from 17 Institutes and Centers have developed a model of strategic leadership to address several of the most common causes of death and disability, as well as rare disorders that affect the brain, spinal cord, or nerve cells throughout the body. The blueprint leverages the abilities of the Institutes and Centers to create new resources, tackle common scientific problems, and train the next generation of neuroscientists through collaboration and leadership.

Supported the reduction of health disparities and barriers to opportunity for minority individuals

"Broadening the collaborative relationships developed through partnerships between NIH and institutions and researchers from all populations," is the focus of Dr. Zerhouni's commitment to eliminating health disparities and disparities in the burden

of disease. In 2007, NIH announced the awarding of $66.7 million to support the advancement of health disparities research. This was the most recent in a series of commitments of funds to this research. NIH has made 58 awards under the Centers of Excellence program. NIH as a whole expects to spend $2.7 billion on research funding for health disparities.

Ensured public access to NIH-funded research results

February 3, 2005, Dr. Zerhouni announced an historic public access policy. For the first time, the public will have access to peer-reviewed research publications that resulted from studies funded by NIH. Dr. Zerhouni has urged maximum participation by investigators, encouraging scientists to submit their publications as soon as possible and within twelve months of publication to the archive.

Committed to earn the public's trust

Dr. Zerhouni continues to seek advice from the public through the Council of Public Representatives (COPR), a recent public trust workshop, and, more locally, through community liaison efforts. He is committed as well to producing the most scientifically-accurate, useful and accessible health information through public health campaigns, fact sheets, over the Web and through a full complement of outreach efforts with special attention to cultural competence designed to keep the public informed.

Enhanced the leadership of NIH

Since becoming the NIH Director, Dr. Zerhouni named a new NIH Deputy Director (Raynard S. Kington, M.D., Ph.D.) and directors for nine institutes and four centers: Center for Scientific Review (Antonio Scarpa, M.D., Ph.D.), John E. Fogarty International Center (Roger I. Glass, M.D., Ph.D.), National Cancer Institute (John E. Niederhuber, M.D.), National Center for Research Resources (Barbara Alving, M.D.), National Heart, Lung, and Blood Institute (Elizabeth G. Nabel, M.D.), National Institute of Diabetes and Digestive and Kidney Diseases (Griffin P. Rodgers, M.D.), National Institute of Environmental Health Sciences and the National Toxicology Program (David A. Schwartz, M.D.), National Institute of General Medical Sciences (Jeremy M. Berg, Ph.D.), National Institute of Mental Health (Thomas R. Insel, M.D.), National Institute of Neurological Disorders and Stroke (Story C. Landis, Ph.D.), National Institute on Alcohol Abuse and Alcoholism (Ting-Kai Li, M.D.), National Institute on Drug Abuse (Nora D. Volkow, M.D.), and National Center for Complementary and Alternative Medicine (Josephine Briggs, M.D).

Prior to joining the NIH, Dr. Zerhouni served as executive vice-dean of Johns Hopkins University School of Medicine, chair of the Russell H. Morgan department of radiology and radiological science, and Martin Donner professor of radiology, and professor of biomedical engineering. Before that, he was vice dean for research at Johns Hopkins.

Dr. Zerhouni was born in Nedroma, Algeria and came to the United States at age 24, having earned his medical degree at the University of Algiers School of Medicine in 1975. After completing his residency in diagnostic radiology at the Johns Hopkins University School of Medicine as chief resident (1978), he remained at Hopkins, serving as instructor (1978–1979) and then as assistant professor (1979–1981). Between 1981 and 1985 he was

in the department of radiology at Eastern Virginia Medical School and its affiliated DePaul Hospital. He returned to Johns Hopkins as an associate professor in 1985. In 1988, Dr. Zerhouni was appointed director of the MRI division. He was promoted to full professor of radiology in 1992 and of biomedical engineering in 1995. In 1996, he was named chairman of the radiology department.

Since 2000, he has been a member of the Institute of Medicine. He served on the National Cancer Institute's Board of Scientific Advisors from 1998–2002. He was a consultant to both the World Health Organization (1988), and to the White House under President Ronald Reagan (1985).

A resident of Baltimore, he has won several awards for his research including a Gold Medal from the American Roentgen Ray Society for CT research and two Paul Lauterbur Awards for MRI research. Earlier this year, Dr. Zerhouni received the Special Presidential Award of the European Congress of Radiology. His research in imaging led to advances in Computerized Axial Tomography (CAT scanning) and Magnetic Resonance Imaging (MRI). He is the author of 212 publications and holds 8 patents.

Department of Health and Human Services

Office of Budget

Richard J. Turman

Mr. Turman is the Deputy Assistant Secretary for Budget, HHS. He joined federal service as a Presidential Management Intern in 1987 at the Office of Management and Budget, where he worked as a Budget Examiner and later as a Branch Chief. He has worked as a Legislative Assistant in the Senate, as the Director of Federal Relations for an association of research universities, and as the Associate Director for Budget of the National Institutes of Health. He received a Bachelor's Degree from the University of California, Santa Cruz, and a Masters in Public Policy from the University of California, Berkeley

Filename: NIH DirectorTestimony (House).doc
Directory: C:\Documents and Settings\tylerda\Desktop
Template: C:\Documents and Settings\tylerda\Application Data\Microsoft\Templates\Normal.dot
Title: NIH Director's FY 2009 Budget Testimony-House
Subject:
Author: bartrumj
Keywords:
Comments:
Creation Date: 3/4/2008 2:02:00 PM
Change Number: 2
Last Saved On: 3/4/2008 2:02:00 PM
Last Saved By: OD/USER
Total Editing Time: 2 Minutes
Last Printed On: 3/4/2008 2:02:00 PM
As of Last Complete Printing
Number of Pages: 16
Number of Words: 5,486 (approx.)
Number of Characters: 30,617 (approx.)